

Model Center-Integrated Reduced Order Multi-fidelity Optimization Scheme for NASA MDAO Framework, Phase II

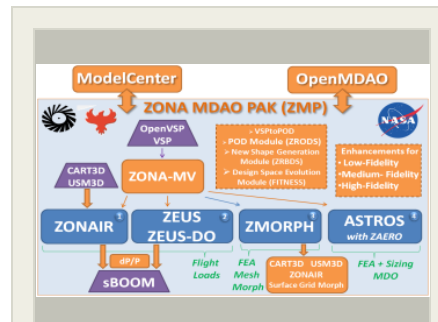
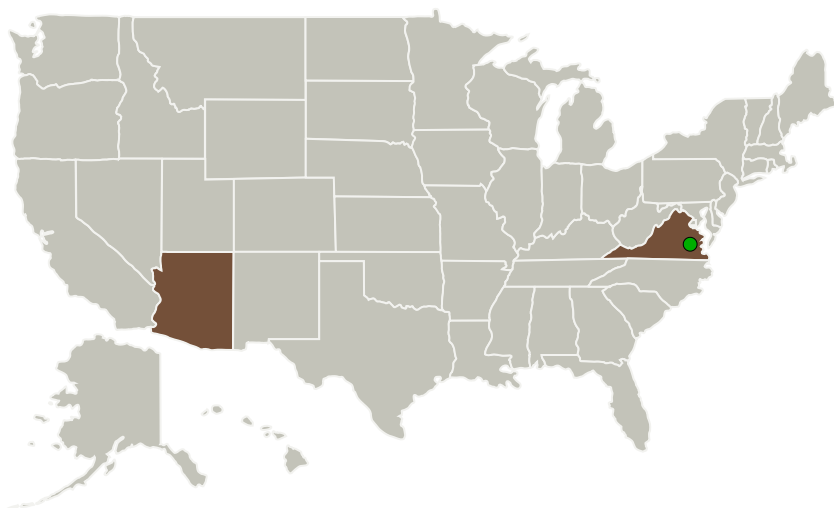
Completed Technology Project (2013 - 2015)



Project Introduction

During Phase I of this effort, ZONA Technology, Inc. significantly improved the medium fidelity design and analysis capability of NASA's MDAO architecture by successfully adding ZONA CAE tools such as ZAERO, ZEUS, ASTROS and ZMORPH synergistically integrated within a ModelCenter MDAO framework. In Phase II of this effort, ZONA aims to improve all the three tiers of NASA's MDAO architecture as follows: (1) The low fidelity capability will be enhanced by incorporating ZONAIR for providing flight loads (for structural design) and pressure differential (for sonic boom mitigation). ZONAIR will also 'flexiblize' rigid CFD loads for aeroelastic analyses, (2) the medium fidelity capability will be further extended by addition of new ModelCenter plug-ins and improvements in the existing plug-ins for ZONA CAE tools, for facilitating ease of design process, and (3) the high fidelity analyses capability will be augmented by the development of supportive software offering beneficial features such as automated surface+flowfield mesh morphing/generation, commonality of input within all branches of fidelity, etc. Rapid shape sensitivity generation capability will be offered with incorporation of ZEUS-DO into the framework. For ease of model-making and input setup process, a pre/post-processor software called ZONA-MV will be further improved with linkage to NASA's VSP tool. A NASTRAN-to-ASTROS finite element model converter will be developed. The overall development outcome of Phase I+II effort will then be combined as a 'ModelCenter.ZONA MDAO Pak' with on-demand cloud computing ability, unlimited tokens for massively parallelized optimization efforts, and will be perpetually licensed within all NASA Research Centers.

Primary U.S. Work Locations and Key Partners



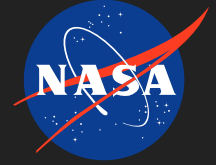
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Organizations Performing Work	Role	Type	Location
ZONA Technology, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Scottsdale, Arizona
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

ZONA Technology, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Darius Sarhaddi

Co-Investigator:

Darius Sarhaddi

Project Transitions



January 2013: Project Start

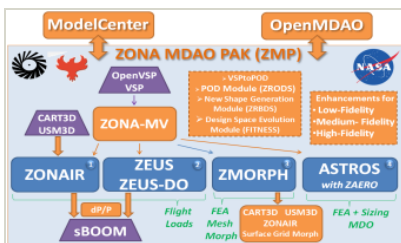


January 2015: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138318>)

Images



Project Image

Model Center-Integrated Reduced Order Multi-fidelity Optimization Scheme for NASA MDAO Framework

(<https://techport.nasa.gov/image/134516>)

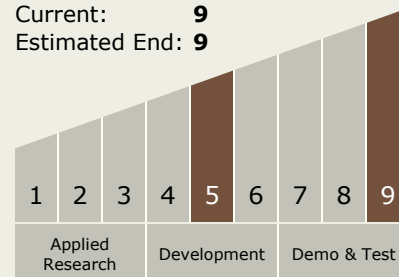
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Technology Maturity (TRL)

Start: 5
Current: 9
Estimated End: 9



Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
 - └ TX11.1 Software Development, Engineering, and Integrity
 - └ TX11.1.7 Frameworks, Languages, Tools, and Standards

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System